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| 10/510,512 | 10/07/2004 | Katsuhiko Takahashi | Q83567 | 8886 |
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| SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037 | | | EXAMINER VDAYAKUMAR, KALLAMBELLA M | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/510,512

Applicant(s)

TAKAHASHI ET AL.

Examiner

KALLAMBELLA VIJAYAKUMAR

Art Unit

1793

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 October 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2, 4, 6, 7 and 9-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 6, 7 and 9-19 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SI/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

- Applicant's amendment filed with the arguments on 10/08/2008 has been entered. Claims 1-2 were amended. Claims 16-19 were newly added. Claims 1-2, 4, 6-7 and 9-19 as amended are currently pending with the application.
- Applicant's amendment overcomes the rejection of claims under 35 USC 112-I and II paragraphs cited in the last office action and prior art by Conaghan (US 2004/0144958).

Claim Objections

Claim 15 objected to because of the following informalities: It depends upon cancelled claim-15 and does not further limit the silver compounds in claims 1 and 2. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-2 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims 1-2 recite the limitation of binder comprises polystyrene, polyethylene polyethylene terephthalate or one or more materials selected from or one or more materials selected from the group consisting of polyvalent phenol compounds, phenol resins, alkyd resins, polyester resins and epoxy resins," which is an improper Markush format. Applicant's need to

rewrite these in proper Markush format: For example, if “wherein R is a material selected from the group consisting of A, B, C and D” is a proper limitation, then “wherein R is A, B, C or D” shall also be considered proper.

Claim Rejections - 35 USC § 102

Claim Rejections - 35 USC § 103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(c), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 16-19 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kodas et al (US 2003/0124259) in view of Bolon et al (US 4,049,844)

Normally, only one reference should be used in making a rejection under 35 U.S.C. 102. However, a 35 U.S.C. 102 rejection over multiple references has been held to be proper when the extra references are cited to (MPEP 2131.01)::

- (A) Prove the primary reference contains an "enabled disclosure;"
- (B) Explain the meaning of a term used in the primary reference; or
- (C) Show that a characteristic not disclosed in the reference is inherent.

Kodas et al teach the composition of precursor composition comprising a dispersion of a molecular metal precursor such as silver oxide, silver acetate, or silver salts in a vehicle such as terpineol, toluene or ethylene glycol, and forming conductive features at low temperatures (Abstract, 0007, 0032, 0050, 0055 and 0098). The solvents meet the limitation of reducing agent in the claims. The precursor composition further contained binders such as a polymer precursor of poly (amic) acid, and polymers such as an epoxy, polyimide, phenolic resin, thermoset polyester, polyacrylate and the like (0140). The molecular metal precursors were present as a combination of nanoparticles with a particle size of 10-80 nm (P 0028) and micron particles with a with a particle size not less than 0.3 micron and not greater than 10 microns (0035). The

nanoparticles were coated with polymers such as polystyrene/methacrylate (P-0045). The particles further included composites such as metal/polymer (0046). The agglomerates of particles were dispersed in the medium by ultrasonic or high shear mixing or 3-roll mill forming primary particles (0037). The ratio of binder in specific examples ranged from 0.83-2.2 parts of cellulose per 100 gm of the silver salt that meets the ratio limitations in the claims 16-19 (Para 0273-0275, 0280) (Also, See Bolon et al, US-844; Cl-6, Ln 5-17); and “[W]hen, as by a recitation of ranges or otherwise, a claim covers several compositions, the claim is anticipated’ if one of them is in the prior art.” *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (citing *In re Petering*, 301 F.2d 676, 682, 133 USPQ 275, 280 (CCPA 1962)). Further, the prior art teaches a viscosity of 1000 cps <10 dPa.sec> and at least about 10,000 cps <100 dPa.sec> (Para 0022). The prior art teaches coating the surface of substrate with the precursor composition, and converting it fully in to solid conductive traces with low resistivities approaching that of metallic silver at temperatures not greater than 185C (Para 0179, 0200, 0273-0275, 0278, Table-06). All the limitations of the instant claims are met.

The reference is anticipatory

In the alternative that the disclosure by Kodas et al be insufficient to anticipate the limitations of instant claims, it would have nonetheless been obvious to the skilled artisan over the prior art disclosure to produce the claimed composition, because the reference teaches each of the claimed ingredients within the claimed proportions for the similar utility of making conductive traces. The burden is upon the applicant to prove otherwise. *In re Fitzgerald*, 619 F.2d 67, 205 USPQ594 (CCPA 1980).

2. Claims 1-2, 4, 6-7 and 9-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kudas et al (US 2003/0124259) in view of Friend (US 5,98,771).

Kudas et al teach the composition of precursor composition comprising a dispersion of a molecular metal precursor such as silver oxide, silver acetate, or silver salts in a vehicle such as terpineol, toluene or ethylene glycol, and forming conductive features at low temperatures (Abstract, 0007, 0032, 0050, 0055 and 0098). The solvents meet the limitation of reducing agent in the claims. The precursor composition further contained binders such as a polymer precursor of poly (amic) acid and polymers such as an epoxy, polyimide, phenolic resin, thermoset polyester, polyacrylate and the like. (0140). The molecular metal precursors were present as a combination of nanoparticles with a particle size of 10-80 nm (0028) and micron particles with a particle size not less than 0.3 micron and not greater than 10 microns (0035). The nanoparticles were coated with polymers such as polystyrene/ methacrylate (P-0045). The particles further included composites such as metal/polymer (0046). The agglomerates of particles were dispersed in the medium by ultrasonic or high shear mixing or 3-roll mill forming primary particles (0037). The amount of the polymer/polymer- precursor for adhesion to the polymeric substrate ranged from 2-8 wt% (0140 and 0158). Further, the prior art teaches a viscosity of 1000 cps <10 dPa.sec> and at least about 10,000 cps <100 dPa.sec> (Para 0022).

The prior art fails to teach the instant claimed ranges per the claims 1-2 and 16-19; and The prior art is silent about the particle size of the polymer per the claim-7.

However, the prior art range of 2-8 wt% polymers overlaps with the instant claimed ranges, and In the case where the claimed ranges "overlap or lie inside ranges disclosed by the

prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990)..

With regard to the claims 4 and 6, Kodas et al teach compositions containing nano and micron sized particles, wherein the nanoparticles had a particle size of not more than 10-80 nm (P-0028) and micron sized particles had a particle size of about 0.3 micron to 10 micron (P-0035), and the composition contains the same components in same proportions as claimed. The prior art particle size overlaps with the instant claimed range and prima facie obvious. The reducing action by the binder would be obvious because similar compositions have similar properties.

With regard to claim-7, Kodas further teach forming conductive features by screen printing the composition that is similar to that claimed by the applicants (0165) and has the same common utility in forming conductive traces. Also the prior art teaches optimizing particle size distribution (P-0038) in the composition, and It would have been obvious to a person of ordinary skilled in the art to optimize the particle size of the components including polymer in the dispersion by routine experimentation as a choice of design of the coating conditions with reasonable expectation of success, and Generally, differences in concentration, viscosity, particle size, period or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration, viscosity, particle size, period or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955), See also *In re Boesch*, 617

F.2d 272, 205 USPQ 215 (CCPA 1980) (prior art suggested proportional balancing to achieve desired results in the formation of an alloy).

With regard to claim 9, the prior art teaches ethylene glycol.

With regard to claim-10, the prior art teaches compositions containing the same components in same proportions as claimed with a viscosity of 1000 cps <10 dPa.sec> and at least about 10,000 cps <100 dPa.sec> (Para 0022) wherein the prior art viscosity range overlaps with the instant claimed ranges, and In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

With regard to the claims 11-14, the prior art teaches coating the surface of substrate with the precursor composition, and converting it fully in to solid conductive traces with low resistivities approaching that of metallic silver at temperatures not greater than 185C (Para 0179, 0200, 0273-0275, 0278, Table-06).

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-2, 4, 6-7 and 9-19 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1, 4-6, 9-18 and 20-24 of copending Application No. 10/500,124 <as amended on 11/25/2008> in view of Kodas et al (US 2003/0124259).

Both the claims of the instant application and the copending application are drawn to similar conductive compositions with similar utility, wherein the instant claims differ from the copending application in not using the dispersant that would have been obvious over Kodas (P-0114). Further, the limitation of comprising in the copending application does not exclude addition of such binders/reducing agents in the composition.

This is a provisional obviousness-type double patenting rejection.

Response to Arguments

Applicants arguments filed 10/08/2008 have been fully considered. The prior art by Conaghan is withdrawn over the amendment.

In response to the argument that cellulose is not found in the noted sections of Kodas, it can be clearly be found in the cited sections of the examples (0273-0275, 0280) (Res, Pg-7, Last Para). The other binders are found in P-0140.

In response to Kodas teaches ethyl cellulose as rheology modifier in 0115 (Res, Pg-7, Last Para – Pg-8, 2-Para); the purpose of addition is immaterial, and It is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by applicant. In re Linter, 458 F.2d 1013, 173 USPQ 560 (CCPA 1972) (discussed below); In re Dillon, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1990), cert. denied, 500 U.S. 904 (1991). Furthermore, ethyl cellulose is a well known binder in conductive inks (See Bolon et al, US 4,049,844;Cl-6, Ln 5-18).

For the reasons set forth above, applicants fail to patentably distinguish their compositions over prior art.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KALLAMBELLA VIJAYAKUMAR whose telephone number is (571)272-1324. The examiner can normally be reached on M-F 07-3.30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 5712721358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KMV/
Jan 04, 2009.

/Stanley Silverman/
Supervisory Patent Examiner, Art Unit 1793